

WHAT IS CLAIMED IS:

1. A collapsible lens barrel comprising:
a fixed cylinder fixed to a camera main body;
a wheel rotatively movably provided around an outer periphery of a proximal
5 end portion of said fixed cylinder;
a plurality of end surface cams disposed on an inner peripheral portion of the
wheel at predetermined intervals;
a movable cylinder which holds a photographing lens, which is guided so as to
be movable in a direction of an optical axis with respect to said fixed cylinder, and which
10 has a plurality of cam followers abutting against said plurality of end surface cams; and
an urging device which urges the cam followers of said movable cylinder to said
end surface cams,
wherein said wheel is rotated to extend said movable cylinder from a collapsed
position to a photographing position.
- 15 2. The collapsible lens barrel according to claim 1, wherein each of the end surface
cams comprises:
a first inclined portion inclined from the optical axis through a predetermined
angle;
a first flat portion formed contiguously to the first inclined portion so as to
20 extend orthogonally to the optical axis;
a second inclined portion formed contiguously to the first flat portion and
inclined from the optical axis through a predetermined angle; and
a second flat portion formed contiguously to the second inclined portion so as to
extend orthogonally to the optical axis,
25 wherein when said wheel is rotated, said movable cylinder is extended from the
collapsed position to a first photographing position through action of said first inclined
portion and first flat portion, and when said wheel is further rotated, said movable
cylinder is extended from said first photographing position to a second photographing
position through action of said second inclined portion and second flat portion.

3. The collapsible lens barrel according to claim 2, wherein each of said end surface cams comprises:

a first projecting portion formed in a junction between said first inclined portion and said first flat portion so as to project from said first flat portion; and

5 a second projecting portion formed in a junction between said second inclined portion and said second flat portion so as to project from said second flat portion.

4. The collapsible lens barrel according to claim 1, wherein said movable cylinder comprises:

10 an internal cylinder having said photographing lens held on its inner peripheral portion; and

an external cylinder which is connected to the internal cylinder at their leading end portions and which has said cam followers formed on an inner peripheral portion of the external cylinder,

15 wherein said internal cylinder is fitted into an inner peripheral portion of said fixed cylinder, and linearly advanced guide portions formed on an outer peripheral surface of said internal cylinder are fitted onto or into convex or concave linearly advancing guide portions formed on the inner peripheral surface of said fixed cylinder along the optical axis so that said movable cylinder is guided so as to be movable in the direction of the optical axis with respect to said fixed cylinder.

20 5. The collapsible lens barrel according to claim 2, wherein said movable cylinder comprises:

an internal cylinder having said photographing lens held on its inner peripheral portion; and

25 an external cylinder which is connected to the internal cylinder at their leading end portions and which has said cam followers formed on an inner peripheral portion of the external cylinder,

30 wherein said internal cylinder is fitted into an inner peripheral portion of said fixed cylinder, and linearly advanced guide portions formed on an outer peripheral surface of said internal cylinder are fitted onto or into convex or concave linearly advancing guide portions formed on the inner peripheral surface of said fixed cylinder

along the optical axis so that said movable cylinder is guided so as to be movable in the direction of the optical axis with respect to said fixed cylinder.

6. The collapsible lens barrel according to claim 3, wherein said movable cylinder comprises:

5 an internal cylinder having said photographing lens held on its inner peripheral portion; and

an external cylinder which is connected to the internal cylinder at their leading end portions and which has said cam followers formed on an inner peripheral portion of the external cylinder,

10 wherein said internal cylinder is fitted into an inner peripheral portion of said fixed cylinder, and linearly advanced guide portions formed on an outer peripheral surface of said internal cylinder are fitted onto or into convex or concave linearly advancing guide portions formed on the inner peripheral surface of said fixed cylinder along the optical axis so that said movable cylinder is guided so as to be movable in the
15 direction of the optical axis with respect to said fixed cylinder.

7. The collapsible lens barrel according to claim 1, wherein said cam followers come into point contact with said corresponding end surface cams.

8. The collapsible lens barrel according to claim 2, wherein said cam followers come into point contact with said corresponding end surface cams.

20 9. The collapsible lens barrel according to claim 3, wherein said cam followers come into point contact with said corresponding end surface cams.

10. The collapsible lens barrel according to claim 4, wherein said cam followers come into point contact with said corresponding end surface cams.

11. The collapsible lens barrel according to claim 5, wherein said cam followers
25 come into point contact with said corresponding end surface cams.

12. The collapsible lens barrel according to claim 6, wherein said cam followers come into point contact with said corresponding end surface cams.

13. The collapsible lens barrel according to claim 1, wherein said movable cylinder is formed of a plastic material in a dark color.

5 14. The collapsible lens barrel according to claim 2, wherein said movable cylinder is formed of a plastic material in a dark color.

15. The collapsible lens barrel according to claim 3, wherein said movable cylinder is formed of a plastic material in a dark color.

10 16. The collapsible lens barrel according to claim 4, wherein said movable cylinder is formed of a plastic material in a dark color.

17. The collapsible lens barrel according to claim 5, wherein said movable cylinder is formed of a plastic material in a dark color.

18. The collapsible lens barrel according to claim 6, wherein said movable cylinder is formed of a plastic material in a dark color.